



# 10

SEQUENCE LISTING

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<120> METHOD FOR PRODUCING L-GLUTAMIC ACID BY FERMENTATION ACCOMPANIED BY PRECIPITATION

<130> 195942US0

<140> 09/641,892

<141> 2000-08-18

<150> JP2000-78771

<151> 2000-03-21

<150> JP11-234806

<151> 1999-08-20

<160> 12

<170> PatentIn version 3.0

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<212> DNA

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Thr Asp Pro Ala Thr Asn Ser Lys Gln Val Lys Val Leu Gln Leu Ile  
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Asn Thr Glu Glu Lys Arg Trp Ile Gln Gln Arg Ile Glu Ser Gly Ala  
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Ser Gln Thr Ser Phe Ser Gly Glu Glu Lys Lys Gly Phe Leu Lys Glu  
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Lys His Pro Thr Pro Arg Lys Ile Tyr Ala Asp Arg Leu Glu Gly Glu  
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Glu Gly Ile Pro Val Arg Leu Ser Gly Glu Asp Ser Gly Arg Gly Thr  
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Trp Asp Ser Val Leu Ser Glu Glu Ala Val Leu Ala Phe Glu Tyr Gly  
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Gly Asp Phe Ala Asn Gly Ala Gln Val Val Ile Asp Gln Phe Ile Ser  
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 770 775 780

Arg His Pro Leu Ala Ile Ser Ser Leu Asp Glu Leu Ala Asn Gly Ser  
 785 790 795 800

Phe Gln Pro Ala Ile Gly Glu Ile Asp Asp Leu Asp Pro Gln Gly Val  
 805 810 815

Lys Arg Val Val Leu Cys Ser Gly Lys Val Tyr Tyr Asp Leu Leu Glu  
 820 825 830

Gln Arg Arg Lys Asp Glu Lys Thr Asp Val Ala Ile Val Arg Ile Glu  
835 840 845

Gln Leu Tyr Pro Phe Pro His Gln Ala Val Gln Glu Ala Leu Lys Ala  
850 855 860

Tyr Ser His Val Gln Asp Phe Val Trp Cys Gln Glu Glu Pro Leu Asn  
865 870 875 880

Gln Gly Ala Trp Tyr Cys Ser Gln His His Phe Arg Asp Val Val Pro  
885 890 895

Phe Gly Ala Thr Leu Arg Tyr Ala Gly Arg Pro Ala Ser Ala Ser Pro  
900 905 910

Ala Val Gly Tyr Met Ser Val His Gln Gln Gln Gln Gln Asp Leu Val  
915 920 925

Asn Asp Ala Leu Asn Val Asn  
930 935

<210> 4

<211> 407

<212> PRT

<213> Enterobacter agglomerans

<400> 4

Met Ser Ser Val Asp Ile Leu Val Pro Asp Leu Pro Glu Ser Val Ala  
1 5 10 15

Asp Ala Thr Val Ala Thr Trp His Lys Lys Pro Gly Asp Ala Val Ser  
20 25 30

Arg Asp Glu Val Ile Val Glu Ile Glu Thr Asp Lys Val Val Leu Glu  
35 40 45

Val Pro Ala Ser Ala Asp Gly Val Leu Glu Ala Val Leu Glu Asp Glu  
50 55 60

Gly Ala Thr Val Thr Ser Arg Gln Ile Leu Gly Arg Leu Lys Glu Gly  
65 70 75 80

Asn Ser Ala Gly Lys Glu Ser Ser Ala Lys Ala Glu Ser Asn Asp Thr  
85 90 95

Thr Pro Ala Gln Arg Gln Thr Ala Ser Leu Glu Glu Glu Ser Ser Asp  
100 105 110

Ala Leu Ser Pro Ala Ile Arg Arg Leu Ile Ala Glu His Asn Leu Asp  
115 120 125

Ala Ala Gln Ile Lys Gly Thr Gly Val Gly Gly Arg Leu Thr Arg Glu  
130 135 140

Asp Val Glu Lys His Leu Ala Asn Lys Pro Gln Ala Glu Lys Ala Ala  
145 150 155 160

Ala Pro Ala Ala Gly Ala Ala Thr Ala Gln Gln Pro Val Ala Asn Arg  
165 170 175

Ser Glu Lys Arg Val Pro Met Thr Arg Leu Arg Lys Arg Val Ala Glu  
180 185 190

Arg Leu Leu Glu Ala Lys Asn Ser Thr Ala Met Leu Thr Thr Phe Asn  
195 200 205

Glu Ile Asn Met Lys Pro Ile Met Asp Leu Arg Lys Gln Tyr Gly Asp  
210 215 220

Ala Phe Glu Lys Arg His Gly Val Arg Leu Gly Phe Met Ser Phe Tyr  
225 230 235 240

Ile Lys Ala Val Val Glu Ala Leu Lys Arg Tyr Pro Glu Val Asn Ala  
245 250 255

Ser Ile Asp Gly Glu Asp Val Val Tyr His Asn Tyr Phe Asp Val Ser  
260 265 270

Ile Ala Val Ser Thr Pro Arg Gly Leu Val Thr Pro Val Leu Arg Asp  
275 280 285

Val Asp Ala Leu Ser Met Ala Asp Ile Glu Lys Lys Ile Lys Glu Leu  
290 295 300

Ala Val Lys Gly Arg Asp Gly Lys Leu Thr Val Asp Asp Leu Thr Gly  
305 310 315 320

Gly Asn Phe Thr Ile Thr Asn Gly Gly Val Phe Gly Ser Leu Met Ser  
 325 330 335

Thr Pro Ile Ile Asn Pro Pro Gln Ser Ala Ile Leu Gly Met His Ala  
 340 345 350

Ile Lys Asp Arg Pro Met Ala Val Asn Gly Gln Val Val Ile Leu Pro  
 355 360 365

Met Met Tyr Leu Ala Leu Ser Tyr Asp His Arg Leu Ile Asp Gly Arg  
 370 375 380

Glu Ser Val Gly Tyr Leu Val Ala Val Lys Glu Met Leu Glu Asp Pro  
 385 390 395 400

Ala Arg Leu Leu Leu Asp Val  
 405

<210> 5

<211> 40

<212> PRT

<213> Enterobacter agglomerans

<400> 5

Met Asn Leu His Glu Tyr Gln Ala Lys Gln Leu Phe Ala Arg Tyr Gly  
 1 5 10 15

Met Pro Ala Pro Thr Gly Tyr Ala Cys Thr Thr Pro Arg Glu Ala Glu  
 20 25 30

Glu Ala Ala Ser Lys Ile Gly Ala  
 35 40

<210> 6

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<221> misc\_feature

<223> Artificial Sequence: synthetic DNA

<400> 6

gtcgacaata gccygaatct gttctggtcg

30

<210> 7

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<221> misc\_feature

<223> Artificial Sequence: synthetic DNA

<400> 7

aagcttatcg acgctcccct cccaccggt

30

<210> 8

<211> 936

<212> PRT

<213> Escherichia coli

<400> 8

Met Gln Asn Ser Ala Leu Lys Ala Trp Leu Asp Ser Ser Tyr Leu Ser  
1 5 10 15

Gly Ala Asn Gln Ser Trp Glu Ile Glu Gln Leu Tyr Glu Asp Phe Leu  
20 25 30

Thr Asp Pro Asp Ser Val Asp Ala Asn Trp Arg Ser Thr Phe Gln Gln  
35 40 45

Leu Pro Gly Thr Gly Val Lys Pro Asp Gln Phe His Ser Gln Thr Arg  
50 55 60

Glu Tyr Phe Arg Arg Leu Ala Lys Asp Ala Ser Arg Tyr Ser Ser Thr  
65 70 75 80



Ile Ser Asp Pro Asp Thr Asn Val Lys Gln Val Lys Val Leu Gln Leu  
 85 90 95  
 Ile Asn Ala Tyr Arg Phe Arg Gly His Gln His Ala Asn Leu Asp Pro  
 100 105 110  
 Leu Gly Leu Trp Gln Gln Asp Lys Val Ala Asp Leu Asp Pro Ser Phe  
 115 120 125  
 His Asp Leu Thr Glu Ala Asp Phe Gln Glu Thr Phe Asn Val Gly Ser  
 130 135 140  
 Phe Ala Ser Gly Lys Glu Thr Met Lys Leu Gly Glu Leu Leu Glu Ala  
 145 150 155 160  
 Leu Lys Gln Thr Tyr Cys Gly Pro Ile Gly Ala Glu Tyr Met His Ile  
 165 170 175  
 Thr Ser Thr Glu Glu Lys Arg Trp Ile Gln Gln Arg Ile Glu Ser Gly  
 180 185 190  
 Arg Ala Thr Phe Asn Ser Glu Glu Lys Lys Arg Phe Leu Ser Glu Leu  
 195 200 205  
 Thr Ala Ala Glu Gly Leu Glu Arg Tyr Leu Gly Ala Lys Phe Pro Gly  
 210 215 220  
 Ala Lys Arg Phe Ser Leu Glu Gly Gly Asp Ala Leu Ile Pro Met Leu  
 225 230 235 240  
 Lys Glu Met Ile Arg His Ala Gly Asn Ser Gly Thr Arg Glu Val Val  
 245 250 255  
 Leu Gly Met Ala His Arg Gly Arg Leu Asn Val Leu Asn Val Leu Gly  
 260 265 270  
 Lys Lys Pro Gln Asp Leu Phe Asp Glu Phe Ala Gly Lys His Lys Glu  
 275 280 285  
 His Leu Gly Thr Gly Asp Val Lys Tyr His Met Gly Phe Ser Ser Asp  
 290 295 300  
 Phe Gln Thr Asp Gly Gly Leu Val His Leu Ala Leu Ala Phe Asn Pro  
 305 310 315 320  
 Ser His Leu Glu Ile Val Ser Pro Val Val Ile Gly Ser Val Arg Ala  
 325 330 335  
 Arg Leu Asp Arg Leu Asp Glu Pro Ser Ser Asn Lys Val Leu Pro Ile  
 340 345 350  
 Thr Ile His Gly Asp Ala Ala Val Thr Gly Gln Gly Val Val Gln Glu  
 355 360 365  
 Thr Leu Asn Met Ser Lys Ala Arg Gly Tyr Glu Val Gly Gly Thr Val  
 370 375 380  
 Arg Ile Val Ile Asn Asn Gln Val Gly Phe Thr Thr Ser Asn Pro Leu  
 385 390 395 400

Asp	Ala	Arg	Ser	Thr	Pro	Tyr	Cys	Thr	Asp	Ile	Gly	Lys	Met	Val	Gln	
				405					410					415		
Ala	Pro	Ile	Phe	His	Val	Asn	Ala	Asp	Asp	Pro	Glu	Ala	Val	Ala	Phe	
			420					425					430			
Val	Thr	Arg	Leu	Ala	Leu	Asp	Phe	Arg	Asn	Thr	Phe	Lys	Arg	Asp	Val	
		435					440					445				
Phe	Ile	Asp	Leu	Val	Ser	Tyr	Arg	Arg	His	Gly	His	Asn	Asn	Glu	Ala	
	450					455					460					
Asp	Glu	Pro	Ser	Ala	Thr	Gln	Pro	Leu	Met	Tyr	Gln	Lys	Ile	Lys	Lys	
465					470					475					480	
His	Pro	Thr	Pro	Arg	Lys	Ile	Tyr	Ala	Asp	Lys	Leu	Glu	Gln	Glu	Lys	
				485					490					495		
Val	Ala	Thr	Leu	Glu	Asp	Ala	Thr	Glu	Met	Val	Asn	Leu	Tyr	Arg	Asp	
			500					505					510			
Ala	Leu	Asp	Ala	Gly	Asp	Cys	Val	Val	Ala	Glu	Trp	Arg	Pro	Met	Asn	
		515					520					525				
Met	His	Ser	Phe	Thr	Trp	Ser	Pro	Tyr	Leu	Asn	His	Glu	Trp	Asp	Glu	
	530					535					540					
Glu	Tyr	Pro	Asn	Lys	Val	Glu	Met	Lys	Arg	Leu	Gln	Glu	Leu	Ala	Lys	
545				550						555					560	
Arg	Ile	Ser	Thr	Val	Pro	Glu	Ala	Val	Glu	Met	Gln	Ser	Arg	Val	Ala	
				565					570					575		
Lys	Ile	Tyr	Gly	Asp	Arg	Gln	Ala	Met	Ala	Ala	Gly	Glu	Lys	Leu	Phe	
			580					585					590			
Asp	Trp	Gly	Gly	Ala	Glu	Asn	Leu	Ala	Tyr	Ala	Thr	Leu	Val	Asp	Glu	
		595					600					605				
Gly	Ile	Pro	Val	Arg	Leu	Ser	Gly	Glu	Asp	Ser	Gly	Arg	Gly	Thr	Phe	
	610					615					620					
Phe	His	Arg	His	Ala	Val	Ile	His	Asn	Gln	Ser	Asn	Gly	Ser	Thr	Tyr	
625					630					635					640	
Thr	Pro	Leu	Gln	His	Ile	His	Asn	Gly	Gln	Gly	Ala	Phe	Arg	Val	Trp	
				645					650					655		
Asp	Ser	Val	Leu	Ser	Glu	Glu	Ala	Val	Leu	Ala	Phe	Glu	Tyr	Gly	Tyr	
			660					665					670			
Ala	Thr	Ala	Glu	Pro	Arg	Thr	Leu	Thr	Ile	Trp	Glu	Ala	Gln	Phe	Gly	
		675					680					685				
Asp	Phe	Ala	Asn	Gly	Ala	Gln	Val	Val	Ile	Asp	Gln	Phe	Ile	Ser	Ser	
	690					695					700					
Gly	Glu	Gln	Lys	Trp	Gly	Arg	Met	Cys	Gly	Leu	Val	Met	Leu	Leu	Pro	
705					710					715					720	

His Gly Tyr Glu Gly Gln Gly Pro Glu His Ser Ser Ala Arg Leu Glu  
 725 730 735  
 Arg Tyr Leu Gln Leu Cys Ala Glu Gln Asn Asn Gln Val Cys Val Pro  
 740 745 750  
 Ser Thr Pro Ala Gln Val Tyr His Met Leu Arg Arg Gln Ala Leu Arg  
 755 760 765  
 Gly Met Arg Arg Pro Leu Val Val Met Ser Pro Lys Ser Leu Leu Arg  
 770 775 780  
 His Pro Leu Ala Val Ser Ser Leu Glu Glu Leu Ala Asn Gly Thr Phe  
 785 790 795 800  
 Leu Pro Ala Ile Gly Glu Glu Ile Asp Glu Leu Asp Pro Lys Gly Val  
 805 810 815  
 Lys Arg Val Val Met Cys Ser Ser Gly Lys Val Tyr Tyr Asp Leu Leu  
 820 825 830  
 Glu Gln Arg Arg Lys Asn Asn Gln His Asp Val Ala Ile Val Arg Ile  
 835 840 845  
 Glu Gln Leu Tyr Pro Phe Pro His Lys Ala Met Gln Glu Val Leu Gln  
 850 855 860  
 Gln Phe Ala His Val Lys Asp Phe Val Trp Cys Gln Glu Glu Pro Leu  
 865 870 875 880  
 Asn Gln Gly Ala Trp Tyr Cys Ser Gln His His Phe Arg Glu Val Ile  
 885 890 895  
 Pro Phe Gly Ala Ser Leu Arg Tyr Ala Gly Arg Pro Ala Ser Ala Ser  
 900 905 910  
 Pro Ala Val Gly Tyr Met Ser Val His Gln Lys Gln Gln Gln Asp Leu  
 915 920 925  
 Val Asn Asp Ala Leu Asn Val Glu  
 930 935

<210> 9

<211> 405

<212> PRT

<213> Escherichia coli

<400> 9

Met Ser Ser Val Asp Ile Leu Val Pro Asp Leu Pro Glu Ser Val Ala  
 1 5 10 15  
 Asp Ala Thr Val Ala Thr Trp His Lys Lys Pro Gly Asp Ala Val Val  
 20 25 30

Arg Asp Glu Val Leu Val Glu Ile Glu Thr Asp Lys Val Val Leu Glu  
 35 40 45  
 Val Pro Ala Ser Ala Asp Gly Ile Leu Asp Ala Val Leu Glu Asp Glu  
 50 55 60  
 Gly Thr Thr Val Thr Ser Arg Gln Ile Leu Gly Arg Leu Arg Glu Gly  
 65 70 75 80  
 Asn Ser Ala Gly Lys Glu Thr Ser Ala Lys Ser Glu Glu Lys Ala Ser  
 85 90 95  
 Thr Pro Ala Gln Arg Gln Gln Ala Ser Leu Glu Glu Gln Asn Asn Asp  
 100 105 110  
 Ala Leu Ser Pro Ala Ile Arg Arg Leu Leu Ala Glu His Asn Leu Asp  
 115 120 125  
 Ala Ser Ala Ile Lys Gly Thr Gly Val Gly Gly Arg Leu Thr Arg Glu  
 130 135 140  
 Asp Val Glu Lys His Leu Ala Lys Ala Pro Ala Lys Glu Ser Ala Pro  
 145 150 155 160  
 Ala Ala Ala Ala Pro Ala Ala Gln Pro Ala Leu Ala Ala Arg Ser Glu  
 165 170 175  
 Lys Arg Val Pro Met Thr Arg Leu Arg Lys Arg Val Ala Glu Arg Leu  
 180 185 190  
 Leu Glu Ala Lys Asn Ser Thr Ala Met Leu Thr Thr Phe Asn Glu Val  
 195 200 205  
 Asn Met Lys Pro Ile Met Asp Leu Arg Lys Gln Tyr Gly Glu Ala Phe  
 210 215 220  
 Glu Lys Arg His Gly Ile Arg Leu Gly Phe Met Ser Phe Tyr Val Lys  
 225 230 235 240  
 Ala Val Val Glu Ala Leu Lys Arg Tyr Pro Glu Val Asn Ala Ser Ile  
 245 250 255  
 Asp Gly Asp Asp Val Val Tyr His Asn Tyr Phe Asp Val Ser Met Ala  
 260 265 270  
 Val Ser Thr Pro Arg Gly Leu Val Thr Pro Val Leu Arg Asp Val Asp  
 275 280 285  
 Thr Leu Gly Met Ala Asp Ile Glu Lys Lys Ile Lys Glu Leu Ala Val  
 290 295 300  
 Lys Gly Arg Asp Gly Lys Leu Thr Val Glu Asp Leu Thr Gly Gly Asn  
 305 310 315 320  
 Phe Thr Ile Thr Asn Gly Gly Val Phe Gly Ser Leu Met Ser Thr Pro  
 325 330 335  
 Ile Ile Asn Pro Pro Gln Ser Ala Ile Leu Gly Met His Ala Ile Lys  
 340 345 350

Asp Arg Pro Met Ala Val Asn Gly Gln Val Glu Ile Leu Pro Met Met  
 355 360 365

Tyr Leu Ala Leu Ser Tyr Asp His Arg Leu Ile Asp Gly Arg Glu Ser  
 370 375 380

Val Gly Phe Leu Val Thr Ile Lys Glu Leu Leu Glu Asp Pro Thr Arg  
 385 390 395 400

Leu Leu Leu Asp Val  
 405

<210> 10

<211> 41

<212> PRT

<213> Enterobacter agglomerans

<400> 10

Met Asn Leu His Glu Tyr Gln Ala Lys Gln Leu Phe Ala Arg Tyr Gly  
 1 5 10 15

Met Pro Ala Pro Thr Gly Tyr Ala Cys Thr Thr Pro Arg Glu Ala Glu  
 20 25 30

Glu Ala Ala Ser Lys Ile Gly Ala Gly  
 35 40

<210> 11

<211> 60

<212> PRT

<213> Escherichia coli

<400> 11

Met Asn Leu His Glu Tyr Gln Ala Lys Gln Leu Phe Ala Arg Tyr Gly  
 1 5 10 15

Leu Pro Ala Pro Val Gly Tyr Ala Cys Thr Thr Pro Arg Glu Ala Glu  
 20 25 30

Glu Ala Ala Ser Lys Ile Gly Ala Gly Pro Trp Val Val Lys Cys Gln  
 35 40 45

Val His Ala Gly Gly Arg Gly Lys Ala Gly Gly Val  
 50 55 60

<210> 12

<211> 58

<212> PRT

<213> Escherichia coli

<400> 12

Phe Leu Ile Asp Ser Arg Asp Thr Glu Thr Asp Ser Arg Leu Asp Gly  
1 5 10 15

Leu Ser Asp Ala Phe Ser Val Phe Arg Cys His Ser Ile Met Asn Cys  
20 25 30

Val Ser Val Cys Pro Lys Gly Leu Asn Pro Thr Arg Ala Ile Gly His  
35 40 45

Ile Lys Ser Met Leu Leu Gln Arg Asn Ala  
50 55